EFFECT OF CONSUMING HI-OLEIC PEANUTS ON ADIPOSITY AND CARDIOMETABOLIC HEALTH

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Background/Aims: Epidemiological evidence indicates an inverse association between nut consumption and obesity, inflammation, hyperlipidaemia and glucose intolerance. We sought to investigate whether daily consumption of hi-oleic peanuts compared with a nut free diet improved adiposity and cardio-metabolic risk markers.
Methods: Sixty one healthy participants (mean ± SD age 65 ± 1 years, BMI 31 ± 1 kg/m^2) consumed hi-oleic peanuts (56 g/day for 32 women; 84 g/d for 29 men) or a nut free diet for 12 weeks, in a randomised cross-over design. Body mass, body composition (measured by dual emission x-ray absorptiometry), C-reactive protein (CRP), lipids, glucose and insulin were assessed at baseline and at the end of each 12-week period. Repeated measures analysis controlling for baseline was used to compare the two diets.
Results: Energy intake was 9 % higher (780 kJ, $p < 0.05$), with no difference in energy expenditure following the peanut phase compared with the control diet. This was attributed to a 23% (22 g) increase in fat intake ($p < 0.001$), predominantly monounsaturated (20 g, $p < 0.05$). Despite the greater energy and monounsaturated fat intakes during the peanut phase compared with the nut free diet, there were no differences in body weight, body composition and other cardio-metabolic risk markers (lipids, CRP, glucose and insulin).
Conclusions: Consumption of hi-oleic peanuts did not alter cardio-metabolic biomarkers or body composition despite the additional energy and monounsaturated fat intake. It is possible that incomplete nutrient absorption occurred, resulting in reduced energy utilisation from the peanuts.
Funding source(s): ARC, Peanut Company of Australia.

BIOFORTIFIED PRODUCE – QUEEN GARNET, A NEW HIGH ANTHOCYAN PLUM

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Background/Aims: Recent publications indicate that the consumption of dietary anthocyanins from fresh food, juice or puree may exert protection against cardiovascular risk factors and type 2 diabetes. The aim of this study was to investigate the bioavailability and metabolism of anthocyanins from Queen Garnet plum (QGP), a new, high anthocyanin plum.
Methods: *In vitro*: blended QGP was subjected to simulated gastric and small intestinal digestion and the bioaccessible anthocyanins were analysed by HPLC-photodiode array detection (PDA)-MS. *In vivo*: Ten healthy men (18-35 years; mean ± SD BMI: 22.9 ± 3.2 kg/m^2) consumed 400 mL QGP juice (QGPJ; 0.95 mmol total anthocyanins and 8.6 mmol total polyphenols) or water (control) in a randomised cross-over design. Urinary excretion of intact anthocyanins and metabolites was analysed up to 24 h post-intake by HPLC-PDA-MS and NMR spectroscopy. Differences between treatments were tested using one-way ANOVA.
Results: The amount of bioaccessible cyanidin-3-glucoside and cyanidin-3-rutinoside from QGP was relatively high (59%) whereas the urinary excretion, mainly as methylated, glucuronidated and sulphated metabolites, was low (0.2% of the ingested dose). Urinary hippuric acid, a colonic/hepatic polyphenol/anthocyanin "end-metabolite", was increased 4.5-fold ($p < 0.05$) after QGPJ consumption (4.35 vs. 0.97 mmol/24 h). Malondialdehyde was significantly reduced ($p < 0.05$) after QGPJ consumption.
Conclusions: It is suggested that QGP anthocyanins are (1) readily bioaccessible, which may be due to the high content in the flesh, and (2) subjected to an intensive metabolism in vivo which may alter their bioactivity and subsequently "dietary value". Follow-up studies are in progress to investigate this further.
Funding source(s): HAL and Nutrafruit Pty Ltd.

Concurrent session 6: micronutrients and biomarkers

METALLOTHIONEIN (MT-2A) GENE EXPRESSION IS UPREGULATED AFTER ZINC SUPPLEMENTATION IN HEALTHY INDIVIDUALS

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Background/Aims: In *in vitro* studies, zinc has been shown to affect the gene expression of zinc transporters and metallothioneins (MT), which are responsible for regulating cellular zinc homeostasis. Expression of these genes may provide novel biomarkers of zinc status in humans.
Methods: Healthy adults ($n = 39$) were randomised to a zinc supplement group (20 mg elemental Zn/day; $n = 19$) or no treatment ($n = 20$) for 21 days. Blood samples were collected on days 0, 2, 7, 14 and 21. Plasma zinc concentrations were analysed using Atomic Absorption Spectrometry. RNA was extracted from peripheral blood mononuclear cells and mRNA expression of zinc transporters, MT-1A and MT-2A were analysed using real-time PCR. Repeated-measures ANOVA were used to test differences between groups.
Results: Thirty-five participants completed the trial (zinc, $n = 17$; control, $n = 18$). In the zinc group, plasma zinc concentrations increased from baseline by 0.98 ± 0.67 μmol/L (mean ± SEM) on day 21 ($p = 0.316$). MT-2A expressions were significantly different between groups ($p < 0.05$) with a significant increase on day 2 in the zinc group (35 ± 17%, $p < 0.05$). No significant changes were observed in other measured gene expression of zinc transporters. Within-subject coefficients of variation in gene expression of zinc transporters and MT ranged from 19-35% ($n = 18$). Gene expressions of zinc transporters and MT were not related to plasma zinc or habitual dietary zinc.
Conclusions: This pilot study showed up-regulation of MT gene expression following zinc supplementation and may be reflective of increased dietary zinc intake over the preceding days.
Funding source(s): University of Sydney and Meat and Livestock Australia.

LONG TERM FOLLOW-UP OF DETERMINANTS OF SEASONAL VARIATION IN VITAMIN D STATUS IN OLDER ADULTS

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Background/Aims: To investigate behavioural impact on long-term seasonal vitamin D (vitD) status in older Tasmanian adults.
Methods: Seventy participants in a study investigating determinants of vitD status returned for follow-up assessment nine months (winter) and 26 months (summer) after study completion (21 male, 49 female; mean ± SD age 69.2 ± 6.4 years, range 60-84 years). Changes in diet, supplement use, time spent outside, sun protection and serum vitD concentration were compared between four time points (summer and winter during the study, winter and summer follow-up) using repeated measures mixed effects linear regression.
Results: Mean ± SD serum vitD (nmol/L) in summer during-study (68.8 ± 22.1) was significantly higher ($p < 0.001$) than winter during-study (52.6 ± 20.9) and significantly lower ($p < 0.001$) than summer follow-up (78.5 ± 16.7) but not different to winter follow-up (65.8 ± 18.3). Winter during-study was significantly lower ($p < 0.001$) than all other time-points. During the study, 15/70 participants took vitD supplements. At nine and 26 months it was 38/70 and 42/70. There was a significant difference in vitD status between supplement and non-supplement groups during-study and winter follow-up ($p < 0.04$); however, summer follow-up results were not different between the two